ances and to make many new ones and his letters give interesting glimpses of the men. Here is one on Lyell:

I must tell one of Sir H. Holland's jokes on Lyell. He saw him running across the street to him one day saying, "Have you heard the news?" "No is Lucknow relieved?" "Oh, I don't know anything about Lucknow—but haven't you heard that we have just got another new marsupial from the dirt-bed at Lyme?" I find Lyell just as nervous as ever—more so in fact—and far more interesting.

In 1866, after a year of tremendous work as expert, his health gave way and he was compelled to go abroad, where with Mrs. Lesley he spent twenty months, wandering as far as Palestine and the Nile. They returned to Philadelphia in 1868 and soon afterwards occupied the home on Clinton St., where they remained until 1893, when his final break came and necessitated removal to their house at Milton. With this return to Philadelphia, there began another period of incessant activity. The danger of poverty, prophesied by their friends, had passed away many years before, but Lesley's appetite for work was insatiable. Mrs. Lesley was scarcely less active in her sphere of organized philanthropy, to which her letters make only incidental references. Mrs. Ames has done well in supplementing them.

The life in Clinton Street is common property, for that house was a Mecca to which all scientific men turned when in Philadelphia, assured of a welcome which would make them think better of their kind. The story has been told so often that it need not be repeated here.

Any notice of this work, brought within reasonable compass, must be only a patchwork of fragments, giving no proper conception of its importance. The long unreserved letters, covering the period from 1838 to 1893, concern not the writers alone; they tell of men and women who have graven their names deeply in science, literature and even in politics; they throw interesting sidelights upon many obscure matters in our country's history, for the Lesleys were associated intimately with many who were leaders in great movements. Mrs. Ames has woven the material so skilfully that Peter and Susan Lesley tell their own story and that of their time. The volumes contain numerous portraits, the last of which is copied from a painting made by their daughter, Mrs. Bush-Brown, not long before they passed away. Professor Lesley, old, feeble, yet cheerfully content, sits with one hand resting on the shoulder of Mrs. Lesley, who still retains the beauty of feature and expression which had endeared her to all acquaintances. The scene is the fulfilment of a prophecy made by Lesley almost fifty years before:

I half believe that when I am an old decrepit man, sitting all day in a well-worn armchair, my volatile and restless nature fixed like carbonic acid into a solid, snow-like equanimity, she will be briskly moving about me like a bright planet around a gone-out sun, and returning to me the little borrowed light and heat that I have ever been so happy as to give her.

Professor Lesley passed away in June, 1903; Mrs. Lesley survived him, but she faded away gradually, until the following January death came to her also. "They were lovely and pleasant in their lives and in their death they were not divided."

John J. Stevenson

The Cambridge Natural History. Edited by Harmer and Shipley. Vol. IV. Crustacea and Arachnida. 8vo; pp. xviii + 566; 287 figures. London, Macmillan & Co. 1909. $4.25.

This volume completes the set of ten of the Cambridge Natural History, and the editors are to be congratulated upon bringing to completion such a comprehensive work, one that exhibits so many excellencies and has been of such great service as a reference work to zoologists.

The delay in the publication of this last volume is due to the death of Professor Weldon, "who had undertaken to write the Section on the Crustacea"; he, however, completed only the chapter on Branchiopoda, while the remainder of the group has been written by Mr. Geoffrey Smith. The Crustacea occupy 217 pages. Chapter I. treats of

their general organization, with special treatment of the segmentation, appendages, body cavity and nephridia, alimentary, reproductive and respiratory organs. The nervous system is entirely omitted, also the musculature and moulting phenomena, and the treatment of the nephridia is rather superficial and not illustrated by figures. The second chapter, on the Branchiopoda, is by far the best on any section of the Crustacea, contains many new figures and unpublished observations on the habits, and terminates with useful keys for the identification of all genera of the Phyllopoda and all British genera of the Cladocera. The remaining chapters contain few new illustrations. Chapter III. deals with the Copepoda, IV. with the Cirripedia and Ostracoda (to the latter is devoted only a little over two pages), and Chapters V. and VI. with the Malacostraca. The parasite *Sacculina* is well treated, with interesting new observations. Parasitic castration is considered, also partial and temporary hermaphroditism (these terms are rather objectionable) and normal hermaphroditism. Phosphorescent organs are interestingly described, but in connection with the compound eyes no mention is made of the work of G. H. Parker. The remainder of the treatment is mainly taxonomic. Chapter VII. deals with the geographical distribution of the group, including the relations of fresh-water and marine faunæ, and the author accepts the view of Ortmann, for which there is now so much evidence, of an original land connection between the continents of the southern hemisphere. While the section on the Crustacea is clearly written, many important morphological phenomena are either omitted or mentioned most briefly.

The Trilobita are very well treated by Henry Woods in 31 pages, about two thirds of the account being devoted to their structure.

Professor Shipley gives in the brief Chapter IX. an introduction to the Arachnida, essentially in agreement with the views of Lankester. He subdivides the Arachnida into the Delobranchiata (though there is no good reason why this should replace the better known Merostomata), and Embolobranchiata; the former includes the Xiphosura and Eurypterida, the latter the Scorpionidea, Pedipalpi, Araneæ, Palpgradia, Solifugæ, Chernetidæ, Podogona, Phalangidea and Acarina. He places the Tardigrada and Pentastomida as "appendices" to the Arachnida.

The Xiphosura are also treated by Shipley, in 21 pages. He follows Lankester in making the eye segment the first, the rostral the second and the cheliceral the third. There is no good description of the eyes or discussion of their homologies, and no figures of them, so that the treatment is decidedly scant, especially in comparison with that given by Korschelt and Heider in their "Lehrbuch."

The Eurypterida are well described by Henry Woods in 12 pages, with good figures from the best restorations.

Cecil Warburton has written the accounts of the remaining arachnidan groups, the Embolobranchiata, and his treatment is a useful contribution, for this is the fullest text-book account yet given of these groups. The best part is the biological and taxonomic, for not much attention is given to the internal anatomy and almost none to the embryology. All the taxonomic families are characterized, though not in the form of analytic keys.

To the Scorpionidea are devoted 12 pages, with the internal anatomy given most briefly; to the Pedipalpi, 5 pages; to the Palpigradi, 2 pages; to the Solifugæ, 7 pages; to the Chernetidæ, 9 pages, with a list of all British species; to the Podogora (Ricinulei), 2 pages; to the Phalangida, 15 pages, a good treatment. In the greater number of text-books the preceding groups, with the exception of the scorpions and solifugids, receive only the barest mention. The large group of the Acarina is treated in 20 pages, too briefly.

The fullest attention is given, however, to the Araneæ or spiders, more than a hundred pages being occupied with this group. There is a good description of the external anatomy and the stridulating organs. But the internal anatomy is too briefly treated, the colulus and various salivary glands are entirely omitted, also the entapophyses, the endosternal structures (a most serious omission) and the

musculature. The author also fails to cite certain important memoirs, such as Gaubert on the lyriform organs, Wagner on the auditory hairs and moult, Lamy on the respiratory organs, and Menge on copulation and sperm transfer. The treatment of the habits (46 pp.) is excellent on the whole, for here Mr. Warburton is much more in his element, though few literature references are given; there is considered the moulting, behavior of the newly-hatched, architecture (especially good on the orbicular nares), poison, fertility, natural enemies, protective coloration and mimicry (at places these two are confused, and also the latter with aggressive coloration), the senses, intelligence and mating habits. With regard to hearing he concludes: "If there be any true hearing organ in spiders its location is quite uncertain"; it is strange he does not even refer to the work of Wagner, Dahl and Pritchett. Chapter XV., 38 pp., is the taxonomic treatment of all the aranead families, with notes on habits and distribution, the classification adopted being that of Simon; only a few of the families are illustrated by figures.

The chapter on the Tardigrada, 11 pages, by Shipley is excellent. He concludes "there can be no doubt that the Tardigrades show more marked affinities to the arthropods than to any other group of the animal kingdom," which is well in accord with our present knowledge. Shipley also contributes a brief but good chapter on the Pentastomida.

In 42 pages the Pycnogonida are well considered by D'Arcy Thompson, with a good account of the structure. There is an excellent figure of the male of *Boreonymphon* carrying the young. All the families are described. As to the genetic affinities he believes "that such resemblances as the Pycnogons seem to show are not with the lower arachnids but with the higher; they are either degenerates from very advanced and specialized Arachnida, or they are lower than the lowest. Confronted with such an issue, we can not but conclude to let the Pycnogons stand apart, an independent group of Arthropods."

We can say of this volume that what is given is given fairly well, the errors are mostly of omission. The most serious omission is the lack of description of the embryology, for in certain of the groups no mention at all is made of the development, and in others nothing except a few larval stages are described. The reader might be led to believe that many of these animals do not have ontogenies! It may be fairly asked, how can any one form a good concept of an animal's structure without a knowledge of its development? At least short résumés of the ontogenies should have been presented. It also occurs to the reviewer that it would have been much better to have devoted two volumes to the groups treated in this one, just as two volumes have been given to the insects. Had this been done, the treatment of each group could have been much more comprehensive, the errors of omission avoided, and the work thus made much more valuable for reference.

Great praise is certainly due to the chapters on the Arachnids, for they help to fill a long-felt want; this group has always received scanty treatment in text-books, and the larger works are not accessible to most students. From most text-book accounts one would gather that the Arachnids are mostly scorpions! It is to be hoped that this last volume of the Cambridge Natural History will arouse wide interest in the group of the spiders, so interesting in structural specialization and instincts, and will lead, in our teaching, to the supplanting of the alcoholic scorpion by the living spider. And it is also hoped it will stimulate more students to investigate those neglected aberrant groups, the tardigrades, pentastomids and mites.

Thos H. Montgomery, Jr.

SCIENTIFIC JOURNALS AND ARTICLES

Internationale Revue der gesamten Hydrobiologie und Hydrographie. Unter Mitwirkung von Albert, Furst von Monaco, Alexander Agassiz, Carl Chun, F. A. Forel, Viktor Hensen, Richard Hertwig, Sir John Murray, Fritjof Nansen, Otto Pettersson und Aug. Weismann. Herausgegeben von Bjorn Helland-Hansen